City of Phoenix
OFFICE OF THE CITY ATTORNEY

Roderick G. McDougall
City Attorney

November 16, 1990

HAND DELIVERED

Mr. Steve Erb
Arizona Department of Water Resources
15 South 15th Avenue
Phoenix, Arizona 85007

Re: Comments on the Preliminary San Pedro Hydrographic Survey Report

Dear Mr. Erb:

Attached hereto are the comments by the City of Phoenix to the Preliminary San Pedro Hydrographic Survey Report. The comments are submitted with the hope that they will assist the Department in its preparation of the Final HSR. While the City's analysis is obviously not as exhaustive as the objection process applicable to the final HSR, I believe it is sufficient to give the Department insight into some significant problem areas.

Thank you for your attention to this matter.

Yours truly,

M. James Callahan

M. JAMES CALLAHAN
Assistant City Attorney

MJC:cf/1717D

c: All parties on the Gila River Adjudication court-approved mailing list

CITY OF PHOENIX COMMENTS ON THE PRELIMINARY
SAN PEDRO HYDROGRAPHIC SURVEY REPORT

The following are comments by the City of Phoenix regarding the preliminary San Pedro Hydrographic Survey Report issued August, 1990. The comments are grouped by subject matter according to the following topics:

1. Report Format (p.1)
2. Indices (p.6)
3. Investigation Criteria (p.7)
4. Claims/Filings/Decrees (p.8)
5. Potential Water Rights (PWR) (p.11)
6. Priority (p.14)
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8. Historical Analysis (p.26)
9. Groundwater-surface Water Interconnection (p.27)
10. Federal Reserved Rights (p. 28)
11. Water Budget/Source of Supply (p.30)

The City of Phoenix has made an attempt to address the myriad of issues raised by the HSR. Because of the volume of material presented in the HSR and the limited time frame provided by DWR to review the HSR, Phoenix has concentrated upon some of the more important aspects of the HSR. Phoenix presents a cross-section of issues in its comments to at least point out the numerous possibilities inherent in interpreting the data compiled for the HSR. Where appropriate Phoenix has suggested changes or additions to the HSR. These suggestions appear in bold type.

REPORT FORMAT

1. DWR's computer generated indices and watershed file reports appear to be incomplete on more than one occasion. The following examples from the HSR illustrate the problem:

- The Region 17 index Map lists a file [112-17-DBA]-37, but the Map for sub-region 112-17-DBA contains irrigation uses and diversions for file number 112-17-DBA-237 at that location. Neither of these file numbers appear in the comprehensive index or in the index in Volume 4. The Map Index gives the name of the owner as Ivan and Esther D. Haynie. The previously mentioned indices do not list this name. The watershed file reports in Volume 4 show no report for the Haynies. Volume 7, "Wells Subject To Federal Claims", does contain a reference for this owner and file number. An abbreviated report is presented in that volume and claim number 39-12253 is listed. The index of statement of claims does not list this claim number.

- Files 112-17-DBA-5 and -10 both appear on map 112-17-DBA, but are not found in any indices or in the published watershed file reports.

It appears that watershed file reports are only published in Volume 7 for certain circumstances. These circumstances are not explained in the investigation criteria in any volume. The reports in the Federal Claims volume are not as comprehensive as the watershed file reports. DWR's investigation criteria require that all uses and claims must result in the creation of a watershed file report. There is no value in separating out the reports which only contain wells subject to federal claims. **All reports should be found in the watershed file report volumes. Those WFRs with wells subject to federal claims can continue to be identified with "remarks" exactly the way they are currently formatted. Volume 7 can then be replaced by an index, or listing of WFRs with wells subject to federal claims.** This will streamline the HSR and allow the Special Master and the parties to view the wells subject to federal claims as part of a complete water use picture.

The parties have only the indices and maps to identify claimants and water uses. The examples above show that the indices are not comprehensive or complete. These items must be reliable for the HSR process to succeed, or a myriad of problems may arise. For example, in the cases above were the parties notified of the publication of the HSR and mailed a copy of their "report"?

2. DWR's criteria for evaluating groundwater wells excludes a determination of an estimated volume for uses supplied solely by groundwater. However, if the well is "subject to Federal Claims" (as all Zone 2 wells are) then an estimated volume is calculated and reported only in Volume 7 instead of in the watershed file reports (WFR). **It would be a simple matter for DWR to include the estimated volume in the appropriate watershed file report, thus saving the parties from having to examine Volume 7. The information contained in Volume 7 is simply a repetition of data found in the watershed file reports without the claims, except that the average efficient volume is reported by DWR in Volume 7. To meet the court's desire for tracking wells subject to federal claims DWR simply needs to create an index of Potential Water Rights (PWRs) and watershed file report numbers. An interested party could then locate specific data by looking at the watershed file report. In this way the use would then be evaluated in relation to all related uses in that file and no information would be missing such as the maximum annual volume. Certainly this will make the task of evaluation easier for all involved.**

3. Each WFR must be able to stand on its own regarding claims, uses, sources, diversions, etc. WFRs which are "shared" require the evaluation of more than one report in order to identify these basic components. Individual WFRs within the Saint David Irrigation District (SDID) provide examples of the problems which may arise because of this policy:

- All SDID surface water supplies are supplemented by groundwater, yet "mixed" water sources are reported only for SDID users who have their own wells.

- SDID wells are subject to federal claims, but individual WFRs within the district do not contain this reference although the WFR for the district does.

- WFRs which report the use of SDID water and contain no reference to additional wells in Zone 2 do not appear in the federal claims volume at all even though a portion of the water supply is subject to federal claims.

- Individual WFRs fail to cite SDID claims or previous filings which are applicable to the uses supplied by SDID water. In some cases the individual has not filed any claims or recorded previous filings, perhaps relying upon the district to file on their behalf. This may raise objections by other parties for failure to file.

These four examples portray an incomplete picture of the potential water rights for these individuals. The parties examining the claims in such an area have an added burden, while the individual is not able to evaluate DWR's conclusions without purchasing or accessing the entire HSR. An individual is only mailed the WFR pertaining to land he owns and has no access to WFRs which are directly affecting attributes of his water right. **The addition of overlapping data to each WFR would allow that WFR to stand on its own without the need to examine other WFRs to understand the uses and claims occurring on that piece of land.**

4. DWR must clearly delineate when information is supplied by a claimant. An example of the need for this identification exists in the special report for the San Pedro Riparian National Conservation Area (SPRNCA). In this instance it is difficult or impossible to determine what information is supplied by the United States or by DWR. Furthermore, the DWR evaluation of the data supplied by the U.S. is not distinguishable from the evaluation which was done independently of the U.S data. Although published U.S. agency reports were used, they are still "claimant" information and should be treated as such.

5. Table 3-12 in Volume 1 contains some discrepancies and errors. This table is titled "Summary of Irrigation District/Private Land Owners Major Surface Water Diversion Systems." For example:

- The table lists 16.7 acres irrigated from East Diversion #4 which includes all lands holding a priority date of 1867. This figure does not include 1.6 acres of land owned by the Nature Conservancy that carries an 1880 date and is irrigated from this same ditch.

- The ditch listed under Claridge is termed "unnamed" but it is referred to in the text and the WFRs as the Nature Conservancy/Claridge Ditch.

- Of the 41.6 acres of land listed under landowner Claridge, only 26 are actually owned by him. The other 15.6 acres are owned by the Nature Conservancy.

- The diversion titled "East Diversion #4" is referred to in the text as the Salazar-Tapia Ditch.

- Under the Nature Conservancy landowner heading, only the Westerfield diversion is listed. The West Ditch which waters 41.3 acres for the Nature Conservancy and 2 acres for the BLM, and an unnamed ditch which waters 16.9 acres for the Nature Conservancy are not listed.

- Only the Bayless Ditch is listed under owner Bayless & Berkalew. The Markham Ditch which serves Bayless & Berkalew and Kelly for a total of 62.2 acres is not listed.

6. **Each WFR should contain a complete listing of map numbers which apply to that report.** It is difficult to determine which maps cover a WFR when more than one map is involved. Currently, the maps have a designation in their margin which shows the adjoining map number, but this pertains to the map as a whole, not individual WFRs which appear on the map. One must look at the legal description of uses and diversions and relate those to map indices to determine which maps cover the WFR. This is extremely time consuming. The inclusion of this information is critical in evaluating the relationship between upstream and downstream users. For example, noncontiguous land within a WFR can be split on the maps by another WFR, and the relationship between these WFRs is difficult to determine.

7. Many WFRs contain a comment about domestic use being supplied by a municipality or water company. No domestic potential water rights are created for these uses. In order to judge impacts based upon total use, as well as to relate the water company file, special report and WFR to the individual users it **is imperative that a listing of each WFR which receives "municipal" water be included as part of the special report in Volume 1.**

8. The identification of municipal service areas should be more accurately defined. It should reflect the corporate boundary and the service area boundary which may not be the same.

9. In its current format the Well Catalogue is cumbersome to use because the data is sorted by legal description only. **Volume 8 should be sorted by "Well Owners Name" also to make retrieval easier.**

10. Regulatory reservoirs and tailwater reservoirs are not identified by DWR except on the maps provided with the WFRs and in the "Explanation" section by reference. **Regulatory reservoirs and tailwater reservoirs should be separately identified in the reservoir section of the WFR.** DWR's methodology for quantifying irrigation rights does not account for the water which may be supplied by these reservoirs or for the effects of the management aspects these reservoirs provide. Therefore, the estimated volumes determined by DWR are not truly reflective of the actual water use for these irrigation rights. Also, some of the regulatory reservoirs store subflow or surface water. Certainly these reservoirs have the potential to receive a water right designation and perhaps should be listed as such.

11. In files where the average efficient and maximum volumes are reported for uses which require an entry in the "remarks" column of that section, the last line of data runs together with the first line of data for the next PWR. **Perhaps the maximum volume can be moved up one line to make it easier to read and to clarify the distinction between PWRs.** The remark in the far right column appears to always relate to the PWR, not to one quantification method or the other, so it is not necessary to complete the remark before beginning the maximum volume data presentation.

12. It appears that Table 5-19 in Volume 1 is outdated. The information listed does not match the WFRs. For the following WFRs, DWR does not include the WFR nor does it list the WFR number or property owner name in the subwatershed volume index: 112-17-BAA-008, 112-17-BAA-092, 112-17-BAA-185, 112-17-BAA-059, 112-17-ACB-006, 112-17-BAA-162, 112-17-BAA-180, and 112-17-BAA-016. For those reports which are published, the data does not match that in Table 5-19. WFR 112-17-BAA-002 shows lands

irrigated with St. David water but does not designate which lands are no longer irrigated. For WFR 112-17-BAD-2, the table lists IR2 but this irrigation use is not listed in the WFR. WFR 112-17-ACB-001 shows an irrigation use, contrary to the information in the table.

13. The explanation for the "Uses Found" column at the beginning of the watershed file report volumes is unclear. It implies that everything identified by DWR is listed there, but in practice it appears to analyze only claimed uses. File 112-17-DBA-323 provides an example of this situation. The explanation needs to be clarified on this point.

14. Figure 5-13 in Volume 1, a map, has numerous incorrect section numbers on it.

At p. 162, ¶4, Volume 1 there is an error in the discussion of the location of the Mexican farm land. It must be located in the upper reaches of the San Pedro not in the lower reaches of the San Pedro as stated.

INDICES

1. Since many watershed file reports and dates of first use are based on the existence of certain previous filings identified by DWR **it is imperative that an index be created which at least relates previous filing number to watershed file report number and owner name. This would be similar to the index which currently exists for statement of claimants.**

2. **Another critical index which is missing is one which relates claimant name to claim number and watershed file report number.** This would enable the claimant to identify where his claim appears especially when it appears in more than one watershed file report. Many claimants filed multiple claims and have no way to relate DWR's assigned number to their claims. This index would also aid the individual who has claims appearing in his WFR which were not filed by him.

3. At p. 11 ¶6, Volume 1, DWR states that discovery has started and refers to its existing responsibility as the central repository. It is appropriate for DWR to describe the system now in place and to provide an index of all materials currently in the repository. This listing could be updated and published within each preliminary and final HSR. **The City of Phoenix suggests that a computerized index be designed by DWR in a format that will readily allow for transfer of data such as by diskette (or whatever) to parties who possess computers. Ease of availibility will lessen the burden on DWR to provide parties access to the repository materials.**

4. **There is a need for an index which interrelates the questionnaires sent, the claim number and the WFR number.** This index would provide partial satisfaction of the Steering Committee's recommendation that DWR publish a list of claimants by Discovery category. This recommendation was based on DWR's report to the Steering Committee stating that the appropriate discovery categories, i.e. Group 1, 2, or 3, would be reported in the preliminary HSR. There is no listing of discovery categories in this preliminary HSR.

5. **As stated in the Order on the Third Set of Issues for Issue A.2.a.5 an index by "drainage area (tributary)" should be added in the HSR so that one can begin an analysis of each tributary at the headwaters and follow the rights downstream.** The current index which is sorted by water source and watershed file number does not accomplish this goal. The sequence of watershed file report numbers is arbitrary in relation to the sequence of rights along the river or its tributaries. Although a detailed analysis of the watershed file report maps will enable one to follow rights downstream, in practice this is almost impossible because of the criteria for watershed file report creation and the discontinuous nature of sub-regional maps.

6. At p. 12 ¶4, Volume 1, although the HSR makes reference to the fact that 640 comments were received on the first preliminary San Pedro HSR one cannot ascertain the status of those comments. The description given in the "Remarks" section of the watershed file report is too brief to definitively determine how those comments were evaluated and incorporated into the HSR. **Furthermore, there should be a listing of watershed file report numbers and/or parties who have filed comments. This will alert the reader to the existence of additional data which is pertinent to a claimed water right. It would be equally helpful to have all final HSRs reflect the disposition of comments received with respect to preliminary HSRs.**

INVESTIGATION CRITERIA

1. Potential water rights listed as "discounted uses" are not adequately explained. An explanation of how a determination of discontinued use is made or why certain items are then reported by DWR while others are not is lacking. Specifically, in some instances dates of first use go back beyond 10 years or in others dates of first use are non-existent.

2. What are the criteria for DWR's analysis when a domestic use is claimed and the source is a water company or municipal system? File 112-17-BA-133 shows that these claimed uses are coded as "municipal" for the "uses found" portion of the report. This will be extremely confusing to those examining the reports because the claim is for a domestic use.

3. **DWR should identify its investigation criteria and the definition of sheetflow used in the HSR.** File 112-14-DDC-001 states that a reservoir was identified, but that its source of supply is sheetflow which is not appropriable. No PWR was created because of this conclusion drawn by DWR. The parties must be able to determine how DWR reached this conclusion.

4. DWR's criteria for handling claims for historical instream stockwatering uses which were replaced by stockponds is not clear and consistent. The parties will not know that the claim identifies the substitution of a stockpond for an instream stockwatering use.

5. In some instances DWR shows that lands formerly irrigated by surface water are now irrigated with groundwater by indicating "yes" under the change of source column. In other instances there has been a source change that is not indicated. What is DWR's criteria for showing a source change?

6. The scale of the aerial photos used to screen stockponds which are 2 acres or more in size is not exact at any one point on the photo. The overlay used to estimate pond size is fixed in scale. How are variances in the photo scale accounted for?

7. Based on the definition of "unused" for a diversion it is possible that the only diversion for a PWR is an unused one. Are unused wells always evaluated for inclusion in Zone 1, 2 or 3?

8. The criteria for stockponds which begins on p. 521 of Volume 1 does not explain how DWR handles ponds which are on-channel and have a well supplementing the surface water supply. **These wells must be identified as to location and pumping capacities.**

9. What is the reasoning for the criteria which results in irrigation uses which are less than 2 acres in size being assigned an average efficient estimated volume and not a maximum annual volume?

10. In file 112-18-029 a "remark" about the certificated stockpond volume differs from the data presented in the computer generated table for that certificate. If this is not a clerical error a more detailed explanation is warranted for these situations.

CLAIMS/FILINGS/DECREES

1. **Because of the importance of certificated water rights and the entitlement Minute Entry requirement that they be**

included in the HSR, the amount of a certificated right should be reported in the PWR summary. By doing so, one can then make a reasonable comparison to the estimated volume derived by DWR. Although this can be ascertained by working back through the watershed file report, it is a difficult and time consuming task which is prohibitive for most parties.

2. In certain cases it is obvious that DWR corrects information before reporting it in the HSR for presentation in the "clearly stated" filings section, but it does not get corrected in the appropriate water rights filings database. **The Department should be making an effort to correct mistakes in the database which are identified and corrected in the output for the HSR.** All of these changes will serve to make the parties task in analyzing the HSR simpler and will avoid the need for DWR staff to provide paper copies of material to interested parties.

3. Does DWR have the capability to report that previous filings have been amended? If so, does this capability extend to amendments filed in the past with predecessors of DWR? How is an amended previous filing identified by Adjudication investigations? Are the surface water records sufficiently updated to identify amendments through the computer databases or through the physical files?

4. The description of decrees contained in Volume 1 is a worthwhile synopsis of these decrees. **It would be advantageous to the parties, given the statutory uniqueness of decrees, for DWR to publish the entire text of each decree in an appendix.** For the San Pedro watershed this is a simple task. Although this may become burdensome in subsequent watersheds it is likely to be less onerous than DWR having to provide copies of the decrees to individuals later on. **Also, it would be helpful to have DWR's assigned number (prefix 20) contained in the published synopsis of the decree. This will aid in identifying the location of the decree in all watershed file reports.**

5. The HSR lists six decrees in the San Pedro watershed. Of these six decrees, only four are related to specific WFRs. The index in Volume 2 references the four decrees utilizing the "20" numerical prefix, but the text description in Volume 1 does not cross-reference the numerical prefix. The two decrees not assigned numerical prefixes are not related to specific properties. For example, the Pyeatt Decree which is identified in Volume 1 pertains to property included in WFR 111-19-DDC-001. This WFR makes no mention of the Pyeatt Decree.

6. DWR notes in its description on p. 499 of the compilation of "Water Use Information" that it will include notices of appropriation in the final HSR reports "if applicable." This information should be included in the

preliminary HSR. The notices should reference the county recorder book and page number of the filing.

7. The table in each sub-watershed volume which lists domestic uses without filings is a very useful tool in identifying those who failed to file. **It would be valuable to create an additional list for any WFR which exists without claims or previous filings.** The WFRs which were created and published should remain intact for examination by the parties.

8. When information is presented for the claims and/or previous filings it is unclear as to what information is original data and what has changed as a result of an amendment or questionnaire **Any new data can be highlighted in bold type or somehow set apart from the original data.**

9. The well catalogue, Volume 8, does not attempt to match well registrations to water uses found in the HSR. In fact, well registrations are not matched to water uses anywhere in the HSR. A valuable data source, especially critical to the evaluation of an individual well's inclusion or exclusion in the bright line area, is missing. By not cross-referencing the wells in the Catalogue to all uses in the HSR duplication of rights is possible for an individual well. **Well registrations should be included in the HSR.**

10. St. David Irrigation District claims are considered by DWR to be applicable to every user within the District. **A more detailed explanation of the claims should be presented in the special report for SDID in Volume 1.** The brief description contained on pp. 323-324 is insufficient. For example, the SDID watershed file report 112-17-88 lists no entry for the quantity claimed for claims 39-6593 and 39-6594, while Volume 1 lists 5500 acft and 8550 acft respectively for those claims. Claim 36-46185 claims a priority of 1936 for the ditch and is applicable to the ditch according to DWR's report while 1881 is the date of first use assigned by DWR. Certainly claims which provide information important to the determination of extent and priority of over 100 watershed file reports warrant a more detailed discussion than the one given.

11. DWR has discounted a decreed right for WFR 115-05-AC-003 (Agro) and 115-05-034 (Claridge). In Volume 1, DWR describes a 1940 decree which established a priority date of 1915 for agricultural, domestic, and stockwatering use. In its investigation, DWR found no use to match the decree. It gave Claridge a 1954 date for stockwatering and Agro a 1936 date for irrigation. Domestic uses occurred at both locations but DWR does not assign dates for domestic uses. These domestic uses may have been associated with the decreed right. **There should be additional analysis when DWR is refuting a decreed right,** especially a decree that dates from 1940.

12. Although the Pyeatt Decree is identified in Volume 1, WFR 111-19-DDC-001 which covers this property does not mention the decree.

13. Adjudication statement of claimants appear in two separate watershed file reports, but the claim dates listed are different in files 112-17-DBA-199 and 112-17-DBA-321. Is there an unexplained criteria at work in this situation or is this evidence of a simple clerical error?

14. On p.17, Volume 1 DWR should explain how it handles Stockpond Registrations and Water Rights Registrations filed after the filing deadline?

15. How will DWR evaluate claims filed by Asarco in the Upper Gila watershed for water transported out of the San Pedro.

16. On p.19 ¶2, Volume 1, the DWR states that decreed rights pursuant to state law are the most reliable water right (which appears to be a legal conclusion). It should be noted that rights pursuant to decrees established under federal law also exist.

POTENTIAL WATER RIGHTS (PWR)

1. There is no valid rationale for the creation of an "incidental" water use. Creating an incidental use instead of a PWR in situations where irrigation is occurring is of particular concern. The volume in nearly every case is going to be larger for the "incidental" irrigation use. This is especially critical for those uses which are supplied from subflow wells. **Claimed uses which are verifiable in the context of DWR's criteria should be assigned a separate PWR.** DWR's water budget analysis further illustrates the problems caused by this treatment of incidental uses. Domestic depletions which are now set at 0.5 acft and must include any incidental irrigation because there is no separate identification of the irrigation uses. The irrigation depletion for 1/2 acre is about 2 acft based on the average efficient volumes calculated by DWR. None of the "incidental" water lost to the San Pedro system is currently accounted for.

2. **Irrigation of less than 1/2 acre associated with a domestic use supplied by subflow should be listed separately as a potential water right.** This would then be consistent with the treatment of surface water sources which prompt creation of a PWR for any acreage.

3. A more complete explanation of "Diversion" potential water rights (DV) should be included in the HSR. File 115-1-BA-1 illustrates some of the problems with these rights. DV1 and DV2 are given priority dates of 1944 based on "claimant comment" (not

fully defined in the HSR) and serve 199 and 47 acres respectively. DWR's investigation criteria state that for irrigation uses claimant comments are only used if the acreage is less than 10 acres. The application of a "claimant comment" to a diversion serving more than 10 acres is not consistent with this criteria. What purpose does a DV potential water right serve? Water rights normally do not apply to diversion structures or canals. In some cases the right to the diversion is placed in a watershed file report in which the use served by the diversion exists, but the diversion itself is in an upstream WFR. Data about diversions presented as part of the right is very useful, but should be reported as a point of diversion, not as a separate water right.

4. A statement appears on p. 505 of Volume 1 which reports that a complete set of filings, one adjudication claim and a matching previous filing, must exist to create a stockwatering PWR. This statement is incorrect according to examples in the watershed file reports and conflicts with the description given in Table 8-2, p. 506. In many cases a stockwatering PWR is created when only one claim or previous filing exists.

5. **Instead of stating "stock" as a "use claimed or referenced" DWR should list "stockpond", "stockwell" or "stock ISU".** This would make analysis of the claim possible in relation to DWR's criteria which evaluate the three uses differently. This data field by definition is DWR's interpretation of what is claimed. Although the claim forms are not designed to claim uses in that format, the integrity of the original claimed data is insured because it appears in the "clearly stated" section of the report.

6. DWR's criteria for creation of PWRs limits identification of wells typically found in Zone 3, such as stockwells. **The statement on p. 110, Volume 1, that other than domestic uses there are no uses which involve withdrawals from wells located in Zone 3 should be qualified to reflect the investigation criteria.**

7. Investigation criteria described by DWR explain that potential irrigation rights are created on the basis of water source and date of first use. However, as in file 111-23-CAA-1, there are cases where irrigation PWRs are created separately when the same source and same date exist. Why is this occurring?

8. On pp. 284-285, Volume 1, DWR mentions that Tombstone began using water in 1881. What is the name of the private company which supplied the water and constructed the initial system? Did this company file on its on its water right and record the filing with the county? At what time did the municipal government take over operation from the private utility? When was

the special use permit obtained from the Forest Service for the pipeline diversion?

9. DWR states that three springs incorporated in the Tombstone system "have been unused since 1977." A better description of the relationship of these springs to the Tombstone water supply is that they are being held in reserve as a backup supply. The same holds true for Tombstone's instream pump. DWR notes in the text that this pump "was used once in 1945" (DWR does not indicate when it was first installed) "but has been abandoned since that time", yet in WFR 111-21-032 DWR states: "Instream pump provides water for emergency municipal back-up uses." The term "abandoned" is a legal one and not appropriate for placement in an HSR.

10. On pp. 113-117, Volume 1, DWR describes the development of irrigated agriculture in the San Pedro area. In its description, DWR makes use of qualifiers in many instances. For example, words such as "probably," "approximately," and "appear to have been" are used. This language raises doubts as to the validity of the data.

11. DWR notes that about 1,500 acres in the San Pedro watershed were in cultivation by 1900. Is this figure based on historical documentation or on DWR analysis of priority dates and acreage served? **DWR should include contemporary historical accounts of the amount of irrigated acreage under cultivation in the San Pedro watershed. The exact source of the information should be referenced in the text.**

12. Table 3-3 of Volume 1 lists 5.1 acres of land as "Recreational Irrigation" under cultivation in the San Pedro watershed during the decade of 1881 to 1890. This gives the impression that this acreage was in use for recreation purposes at that time. In fact, this acreage was then agricultural land which was later classified as a recreational use by DWR. This results in the creation of a type of water right not recognized in the water code - recreational irrigation - and one which is treated differently by DWR for the purposes of quantification of amounts used. This same situation applies to the classification of "other irrigation" created by DWR and reported in Table 3-3.

13. Table 5-30 of Volume 1 appears outdated. In some instances DWR has reported the irrigation use as "IR" in the table but "OT" in the WFR. This occurs for files 112-17-ACD-137 and 112-17-ACD-143. In other instances DWR has reported the "IR" shown in the table as "IR90" in the WFR. This occurs for 112-17-DBA-198. In some instances the table shows the property as no longer irrigated but the WFR lists a current irrigation use. This occurs in 112-17-DBA-123, 112-17-DBD-002, and 112-17-DBA-061.

14. On p. 465, Volume 1, DWR reveals a bit more information on the Salazar-Tapia ditch in Aravaipa Canyon but the information in the text does not match that in WFR 115-05-AB-001. The text calls the ditch the "Salazar-Tapia ditch" but the WFR refers to it as "east diversion #4." In addition, the text states that the ditch was constructed by the Salazar family in 1908, but the WFR gives a diversion PWR a date of 1887 and the irrigation PWR a date of 1867. This discrepancy in dates should be explained by DWR.

15. Table 5-8 in Volume 1 shows the source as "springs" for WFR 115-5-DB-1 (Lackner). However, the maps and WFR show that the source of this water is supplemented by a cement dam in the "Right Prong" of Four Mile Creek. For the sake of accuracy, Table 5-8 should list both springs and the supplemental surface water as a source.

16. On p.158 ¶1, Volume 1, the statement that "most of the reservoirs are supplied by groundwater, surface water or appropriable subflow" implies that DWR reports other reservoirs which exist and are supplied by some other source. What is the nature of these other reservoirs and where do they appear in the WFRs?

17. Instream stockwatering uses which apply to a reach of a stream are given only one specific legal description. The HSR does not explain how this description was derived.

PRIORITY

1. Since the data sources for each PWR are not published and an evaluation of the assignment of dates of first use is impossible without this information **DWR should use the "Explanation" section of each WFR to explain the logic behind each assigned date or for those dates which do not exactly match the claim.** For example in the Aravaipa area there are irrigation rights with previous filings claiming a priority of 1880, the ditch serving them has an historical date of 1867, the photo date is 1936 but the priority date assigned by DWR is 1936 rather than 1880. The 1880 date would be expected if DWR's stated criteria were applied. **DWR should supply an explanation as to how the assigned date was determined.**

2. On p. 498, Volume 1, DWR lists the historic aerial photography used to determine dates for when irrigation was first used. It appears that most of the first use dates were derived from the aerial photography. This indicates a substantial reliance on one class of data. DWR notes that "historic photos are a key factor in establishing apparent dates of first water use." **Given this importance, DWR should describe the criteria used for selecting the aerial photos.** Are other photos available

that were not used? In the WFR's, DWR should indicate all photos that were available for the property under investigation rather than indicating only those which were used to determine the final date.

3. **It is necessary for analyzing watershed file reports to have a listing of the dates of each aerial photo used by DWR in the analysis for each PWR.** Without this information an understanding of how the date of first use was derived by DWR is virtually impossible.

4. **DWR should publish a list for the entire San Pedro watershed which shows the <u>available</u> aerial photography data sources.** This information much be identified by DWR when it begins investigations of a watershed so that it can determine which photos to purchase and utilize. This data will be of great interest to individuals who are seeking documentation of their water right. Although DWR may not have had the financial resources to purchase every available photo, an individual may be able to acquire photos of interest if this information is made available.

5. The "source change" data described by DWR is very confusing. It is difficult to determine when or how DWR identifies changes in source. For example, in files 112-17-DBA-199 and 112-17-DBA-321 an irrigation use began in 1881 according to DWR's analysis and is currently supplied by the SDID and two wells. Statement of claimants pinpoint the addition of the wells as a water source in 1900. This appears to be a change of source from surface water to mixed. Why is this change not categorized as such by DWR?

6. How did DWR use the ditch alignment information in assigning dates of first use? There are irrigation PWRs up slope from the 1881 ditch yet down slope from the 1916 realignment which have the earlier 1881 SDID date assigned to them.

7. The historical ditch alignment map published for the St. David Irrigation District is a very important data source. **DWR should present this map at the same scale as the watershed file report maps, or should put the data directly on the watershed file report maps.** This will provide a simple method to correlate irrigation PWRs to the ditch alignment on a one-to-one basis. Without this improvement the Special Master and the parties will have to access the DWR photo mylars used to create the maps. This will be more time consuming and will require the use of DWR staff. Similar data which DWR has identified for other surface water ditches should also be presented in this manner.

8. DWR starts its historical analysis of the St. David Irrigation District on p. 320 of Volume 1. It notes an incorporation date of 1883 for the canal company, revisions to the articles in 1908, the notice of appropriation in 1908, and a third revision to the articles in 1933. The map (Figure 5-13) indicates two claimed dates -- 1881 and "1916 or later" but does not indicate any other dates. Of the 132 parcels, sixty-seven carry a date of 1881 and thirty-three carry a date of 1916. These lands were placed into production in an incremental fashion, not all at once. DWR notes that St. David was settled by only five families in 1877. Over the years, more and more families arrived and placed lands into production. This same situation occurs with the lands added in 1916. DWR notes the 1916 realignment "added approximately 550 acres of land, as of 1989." **An improved analysis would be to document the exact date the lands were placed into cultivation, rather than working backward from 1989.**

9. One further note regarding SDID is that the notice of appropriation was filed in 1908, but most lands are given an 1881 date. It is quite likely that the 1908 reorganization and notice filing represent some change in the operation of the canal and that some lands should carry a 1908 date. The difference between the appropriation date and the filing date is not discussed by DWR. **The criteria used to establish dates of first use that differ from notice dates should be described.**

10. On p. 16 ¶4, Volume 1, the discussion centers upon "Old" rights and "Claimed" rights filed pursuant to rules and regulations of the State Land Department for rights established prior to 1919. Does DWR have an independent method for retrieving these rights or are they only included when the claimant provides the information? Does DWR obtain copies of these documents from the State Archives? **Since DWR is relying on this data it should be accessible at DWR instead of only at the State Archives.** Files were transferred to DWR from the State Land Department when DWR gained custodial responsibility for the state's water rights filings. DWR in turn relinquished these files to the State Archives according to the Operations Division of DWR which is responsible for the water rights filings.

11. DWR has utilized affidavits to assign dates of first use. In the Aravaipa sub-watershed there are references to an affidavit being used to establish a priority date of 1867 for the Salazar-Tapia Ditch. No details are given as to the origin of the affidavit or its contents. Many statements of claimants contain affidavits supporting the claim, but there are no references to these affidavits in any WFRs. DWR should state how these affidavits were obtained and by whom they were drafted.

12. DWR presents a description of the Pomerene Water Users Association on pages pp. 306-309 of Volume 1. Included is a

reference to the notice filed in 1908 with the Cochise County Recorder. DWR lists the date of first use as 1912. What is DWR's criteria for establishing a date of first use which differs from that listed in a notice of appropriation?

13. On page 306 of Volume 1 DWR states that a 1931 flood "led to the bankruptcy of the Benson Canal Company" and the establishment of the Pomerene Water Users Association in 1936. In an earlier reference to the Benson Canal Company, on page forty-seven of Volume 1 DWR states: "This organization went bankrupt in 1927." How are these two different bankruptcy dates reconciled? What was the impact of the bankruptcy on water deliveries during the period from 1927 to 1936 (1931-1936)? Did water deliveries continue after the Benson Canal Company went bankrupt? When did the Pomerene Water Users Association begin deliveries?

14. DWR starts its description of the Naco water system with a 1946 tank construction episode on p. 278 of Volume 1. Naco is an old border town with a record of municipal use prior to 1946.

15. Volume 2 contains the comprehensive indices for the San Pedro HSR. Table 8 lists the WFRs sorted by date of first use. An examination reveals a tremendous number of stockwatering uses with extremely early dates. For example, several carry the date 1800. It is unlikely that a case could be made for continual use of stockwater from 1800 to the present. This same problem applies to the many other stockwatering uses listed. The vast majority have very early dates, for the most part ascribed to surface water from streams, creeks, and rivers. DWR has relied only on claimed information for these dates. What independent information exists to corroborate these very early stockwatering dates?

16. An examination of early irrigation uses indicates a similar reliance on claimed information. Smaller uses lack verification through independent historical analysis. For example, DWR gives ASARCO a 1873 date for an irrigation use. The WFR cites only claimed information from the 1974 Water Rights Registration Act as the source of the assigned date. No mention is made of a ditch, source or other historical information. As a second example, WFR 115-10-BBC-001 gives an 1880 date to "other irrigation." If this is an early homestead it could be verified, but there is no indication DWR did so. On another early filing, DWR notes for WFR 115-04-AAD-002 that "An extensive comment was received which described uses, diversion locations, and claimed priority dates." What independent analysis was conducted to verify the claimed information?

17. On page 508 of Volume 1 in Table 8-3 DWR presents a summary of its criteria for establishing dates of first use. In

most instances DWR states that a certain method "may" be used to determine the date. There is no indication in the WFR of which method was ultimately used. DWR notes that "local historical analysis" is one of the options, but it is evident from a reading of the WFRs that this method was seldom used. For the most part, DWR relied on claims and aerial photos for its dates. For a domestic use DWR does not list any basis for establishing the date of first use. **In the final HSR, DWR should list in each WFR the information and methodology it used to determine the date of first use.**

18. WFR 112-17-AC-032 (Goodman) shows a claim date of 1881, a photo date of 1936, and an apparent first use date of 1919. The source of the 1919 date is listed as "St. David ditch info." Other properties with the same information are given dates of 1881 or 1916, the initial construction date and the expansion date of the ditch respectively. DWR should reveal the exact nature of information which resulted in the 1919 date since that data is lacking from the historical analysis published in Volume 1 to supplement the WFR information.

19. For WFR 115-10-BBC-001 (Goodwin) the report lists a certificated priority date of 1962 and a "36" filing date of 1880. DWR assigned this claim a date of 1880. In this instance DWR has discounted a certificated date in favor of a claimed date. What are the circumstances that led to this particular decision and what is DWR's criteria in similar situations?

20. Pages 294-295 of Volume 1 describe the history of irrigation use along the Aravaipa Canyon area. DWR states that "the first beneficial use of water along Aravaipa Creek was by Epigmenio Salazar in 1867." According to information gleaned from WFR's, six separate parcels carry 1867 dates and these parcels are served from two different ditches. What is the relationship of these other parcels and ditches to the original 1867 Salazar homestead? Were both ditches constructed in 1867?

21. DWR mentions a 1905 survey which resulted in Aravaipa Canyon lands receiving patents in 1909. The "References and Bibliography" section in Volume 1 does not include any publications dating to either 1905 or 1909. What is the source of the patent information?

22. Many of these early diversions in the Aravaipa Canyon area are short small ditches. The description by DWR makes it difficult for users of the HSR to follow the development pattern in this area because the ditches are not identified by name. DWR does identify the name of the surface water diverter in Table 5-8. **It would add to the clarity of the HSR to have an index of each ditch utilizing surface water in the San Pedro watershed. This index would include the name of the ditch, the**

lands served by WFR number, the date of the ditch (including any additions or changes), and any notices filed with county recorders. A sample table showing possible format for some of this information is appended hereto.

23. There is an inconsistency in terminology used for surface water diversion ditches by DWR in the Aravaipa Canyon area. For the Nature Conservancy (listed as "Arizona Chapter of the Nature Conservancy" in Table 5-8 of Volume 1), WFR-115--5-AC-005 lists D1 as "East Diversion #4" under the section titled "Diversions" but lists D1 as "Salazar-Tapia Ditch" under the "Explanation" section. D2 is called "Unnamed" under the "Diversion" section but is listed as "Nature Conservancy West Ditch" under the "Explanation" section. D7 is listed as "Unnamed" under the "Diversion" section but is listed as the "Nature Conservancy Claridge Ditch" under the "Explanation" section. D7 is called the "Claridge Diversion" on Plate 9.

24. On page 527 of Volume 1 DWR gives a summary of its investigation methods with regard to irrigation uses. In the first paragraph DWR states that many irrigation activities in the Gila system were "established in the late 1800s." In fact, the largest expansion of irrigated agriculture in the San Pedro watershed came in the twentieth century after the Second World War. For example, less than ten percent of irrigation use in the San Pedro occurred prior to 1900.

25. In the third paragraph of page 527 in Volume 1, DWR presents a generalization which results in confusion. It states that the 1935-36 Soil Conservation Service aerial photos are "generally the earliest that can be obtained and utilized." Since no earlier comprehensive aerial photos exist, a more accurate statement is that these photos <u>are</u> the earliest available.

26. DWR states that historical analysis of irrigation use is conducted to verify claim dates. In actual practice, DWR often relies on claimant information. DWR should indicate when it is relying on particular types of data for dates in the WFR. If claimant information is used, it should be identified. By a similar measure, references to local historical analysis should be accompanied by citations.

27. In Table 5-18 in Volume 1, DWR lists the date of first use for the lands under the Pomerene Water Users Association. Of the fifty-four parcels listed, thirty-two have a first use date of 1912. Even given that there may have been some fragmentation of original larger holdings into smaller parcels, it is unlikely that all of the acreage listed by DWR came into cultivation in the same year of 1912. It is much more probable that the irrigation system was gradually expanded to cover more and more lands after its completion. The assignation of one date

for all of the early parcels masks the incremental nature of agricultural development.

28. The inclusion of a map on p. 307 of Volume 1 showing the Pomerene lands is an improvement over the treatment of ditches in the Aravaipa Canyon area where no map was included, but the Pomerene map should have a means of designating the different appropriation dates as on the map of the St. David Irrigation District.

29. On p.14, ¶1, in Volume 1, DWR presents a list of methods for obtaining a water right. It should be made clear that this list is not intended to represent every method for legally obtaining a water right.

30. Pages 299-300 of Volume 1 describe the history of the Bayless & Berkalew Company ditches. DWR states in its summary that "according to claims filed" by Bayless & Berkalew, the Bayless Ditch was constructed circa 1900. DWR notes further: "From the claimant information, it appears that the diversion dam and ditch system were constructed at this time." What type of historical information is available regarding the Bayless Ditch independent of claimant data? The text mentions "the rarely used Markham ditch." When was the Markham Ditch constructed? Does the Markham Ditch serve lands other than Bayless & Berkalew?

31. There is an inconsistency in dates for surface water diversion ditches in Aravaipa Canyon. Claridge and the Nature Conservancy received an 1867 date for WFR-115-05-AC-004 and WFR-115-05-AC-005 from D7 and several WFRs (115-05-AB-001, -002, and -003) received a priority date of 1867 from D1. On page 465 of Volume 1 DWR states that the Salazar-Tapia ditch was constructed in 1908. On page 295 of Volume 1 DWR states that "the first recorded beneficial use of water along Aravaipa Creek was by Epigmenio Salazar in 1867." What is the relationship between these parcels that carry 1867 dates? Were both D1 and D7 constructed in 1867? Why is the Salazar diversion described in the text as the first recorded use when both D1 and D7 for the Claridge Ditch and Salazar-Tapia Ditch carry the same date? DWR assigned the 1867 date to Salazar on the basis of a claim and previous filing, but extended the 1867 date to Pacheco and Miranda on the basis of an affidavit. What is DWR's criteria for the use of affidavits in its historical analysis?

32. A problem of nomenclature occurs with the Paul L. Sale Investment property described on page 475 of Volume 1. The text mentions the Young and Pringle irrigation ditch constructed in 1878, but WFR 114-04-BAB-007 does not mention the name of the ditch because the diversion has been changed to pumping from wells. The WFR does mention an unnamed 1884 ditch which is the subject of an "old filing" (# 0-110) but the relation of this

ditch to the 1878 ditch is not made clear. No 1884 appropriation date is listed by DWR.

33. DWR states on p. 7 of Volume 1 that "water rights which have been established under federal law are claimed by the United States and Indian tribes." Other parties have claimed rights based on federal law, although they may not be federal reserved rights.

EXTENT

1. The City of Phoenix is on record in opposition to the imposition of Groundwater Code standards to the quantification of surface water rights. Nevertheless, Phoenix is commenting on the standards presented in the HSR. These comments should not be construed to mean that Phoenix has changed its position on the basic issue of the applicability of Groundwater Management Act principles to the adjudication of surface water rights. The correct standard is and remains beneficial use which cannot be defined by typical crop patterns, assigned efficiencies and Area of Similar Farming Conditions (ASFC).

2. The information "summarizing" the water rights entitlement issue decision in the March 17, 1989 Minute Entry, presented on pages C-1 to C-2 of Volume 1 is actually a reprint of the two-page Appendix A originally prepared by DWR and attached to that decision. DWR should reference this fact to make it clear that additional factors are stated elsewhere in the eleven page Minute Entry which are pertinent to the quantification process.

3. On p.151 of Volume 4, table 3-13, DWR does not list any monitoring or measurement programs for irrigation acres which it categorized as "deficit irrigation." That determination cannot be made based on a mere qualitative analysis of the acreage.

4. DWR's assessment of "deficit irrigation" may be a reasonable qualitative description of the apparent yield for a given farm, but should not result in the assignment of 100% efficiency to any irrigation use. The efficiency component of the water duty is independent of the consumptive use or crop yield. It is a function of the delivery system, slope of the land, irrigation scheduling, rate of application, etc. The error created by the assignment of 100% efficiency by DWR is illustrated by the following scenario: a farmer applies water only two times during the growing season, but the optimum irrigation application pattern is four times. The efficiency is not increased. The same efficiency results for each irrigation application and it is based on the factors mentioned previously. Research in the AMAs or anywhere else has not identified any irrigation systems which are 100% efficient.

5. Since application efficiencies are a function of delivery systems, type of application technology, irrigation management practices and land slopes, one would expect the type of analysis presented in Table C-5 in Volume 1 (delivery system efficiencies) to yield consistent results regardless of geographic location. One may look to research performed by DWR in preparation for the Second Management Plans for recent evaluations of efficiencies. Efficiencies used in the HSR are less than those developed by the AMAs. For example, values for drip irrigation in AMA studies are at least 90% and for laser leveled fields they are at least 85%. Also, the HSR does not account for management practices which are shown by AMA studies to vary efficiencies for identical systems by 10%.

6. On p.150, ¶2 of Volume 1 the statement that only 83 acres in the San Pedro River watershed, all in Aravaipa, receive enough water to meet the TIR is not accurate. Table 3-12 does support DWR's conclusion since it is not a complete listing of all surface water diverters in the San Pedro. It also assumes that the irrigation districts and "cooperative ventures" described allocate surface water to members on an equal basis. There is no evidence in the HSR for this conclusion.

7. DWR reports rates of flow for diversions of surface water. The March 27, 1989 Minute Entry on entitlements directed that decreed rates of diversion for those surface water systems be reported. The WFRs have that capability but the data is not reported. **The WFR should report the certificated rate of diversion when a certificate of water right is found to be applicable by DWR, as well as decreed rates of diversion.**

8. Appendix C.2 in Volume 1 describes calculations performed by DWR to identify "maximum demand rate" which shows the "amount of water that needs to be diverted to optimally supply the crop irrigation requirement . . . after accounting for canal system losses." The data necessary to perform these calculations is identical to the data which is necessary to create a distinct ASFC. DWR has calculated the maximum demand rate for 9 surface water diversions listed in Table C-8. **DWR has the ability to create separate ASFCs for these diversions and should in fact do that (if the terms of the March 17, 1989 Minute Entry are to be implemented).** This will lessen the inaccuracies involved with assigning a single ASFC to the entire San Pedro watershed.

9. The basis for DWR's reduction of acreage for the quantification of maximum annual volume is unclear. It appears to be an evaluation of crop rotation patterns based on aerial photo interpretation. This is a difficult task to accomplish without cropping histories and contains many pitfalls as evidenced by problems with water duties generated in AMAs for the first management period. Those water duties were based on crop

histories submitted by applicants for a 5 year period. **The court and the parties would be better served with the presentation of the maximum possible annual volume based on all the PWR acreage being in production in one year.** This is apparently more in line with the intent of the entitlement Minute Entry and removes the appearance that the "fallow" acres are not due an entitlement. The question of a reduction in right due to non-use in any given period should not be allowed to creep into the entitlement process.

10. The description of the maximum annual volume is incomplete. It is unclear if the calculation was carried out for each PWR, each watershed file report, on a sub-watershed basis, etc. **A sample calculation like the one presented for the efficient volume would be helpful. This could show an existing file, list the available data for the file and show how it was used to calculate the actual volume.**

11. When calculating PWR maximum volumes for any given use in a WFR how does DWR account for the 16.1% of the total acres which are listed in the two "unknown" crop type categories?

12. The calculation of weighted total irrigation requirement (TIR) considers only three crop types which comprise 60% of the total crop types in the area of similar farming conditions (ASFC). By contrast composite farms in AMAs are composed of 4 crop types whose combined total is over 90% of all crop types actually grown. This crop mix is determined from random sample surveys within each ASFC. The ASFC delineated in the HSR does not contain a sufficient percentage of the total crops actually grown to accurately reflect the conditions for a composite farm within an ASFC. **The concept of an ASFC requires the creation of a composite farm which reflects a typical farm in an ASFC. Since DWR has the data (Table C-6) for about 18% of the additional crop types, a more accurate weighted irrigation requirement is possible with the current data.** As currently derived the water duty is of little value because it may not be representative of typical farm units found in the San Pedro River watershed.

13. DWR recognizes that crop surveys are lacking in certain instances and states that additional data will be collected prior to the publication of the final HSR. Given DWR's stated time frame for publication of the final HSR and the growing seasons for the crop types for which DWR lacks the most data, it does not seem possible that an update to the crop surveys will be possible.

14. A reduction in the volume of a water right by the effective precipitation, as DWR has done for its HSR calculation of both maximum and efficient volumes, is a concept which is applicable to the Groundwater Code only. The amount of water

appropriated is based on the need to use that water for beneficial use. If rainfall does not occur in a given year the right allows for the complete satisfaction of beneficial use. DWR's methods assume that average rainfall occurs each year and that it will then supplement the water right. Reliance on average rainfall or any rainfall has no bearing on appropriation for beneficial use.

15. The average weighted crop irrigation requirement (CIR) presented in Appendix F-5, column 4 is 2.75. The weighted TIR for the ASFC created for the San Pedro River is 2.86. These values should be the same if the correct crop mix for a typical farm is used for the ASFC.

16. The values for TIR presented in Table C-7, part A (weighted total crop irrigation requirement) are not the same as those presented in Table C-4, (total irrigation requirements) when the weighted averages are computed. How were they derived?

17. The origin of the weighted efficiencies used in Table C-7, part B are not explained. They are not averages of the values found in Table C-5, nor do they match any specific values in that table. DWR should report how this information was derived because of its importance in calculating the water duty.

18. Uses which are supplied from a combination of more than one source, i.e., Zone 1, Zone 2, or surface water are given one total number for the estimated volume. It is impossible for the Master or the parties to determine how much water is supplied for each source. These sources may be given different rights or may be administered differently because of the legal implications of the "river system and source". **It is imperative that DWR provide the information necessary to determine the individual amounts from each source.**

19. **When DWR identifies shared uses an analysis of the sources of water should be done to identify how much water can be supplied by the diversion in question.** This is done by DWR for several (but not all) shared surface water diversions, but not for other uses. For those uses supplied by wells the pumping capacity of the well(s) in question could be identified from well registrations or other claims and reported in the HSR. This would give the parties a reasonable starting point to evaluate the volumes claimed or reported by DWR.

20. DWR should report identical information for uses which are contiguous, but are split by an ownership boundary and therefore appear in different watershed file reports. File 112-17-DCA-12 and 112-17-DCA-10 illustrate potential inequities which result when this is not done. PWR IR1 is irrigated acreage split by land ownership boundaries. In file 10 both an average efficient and maximum annual volume are reported. File 12

contains a portion of IR1, but it is only 0.1 acres in size. As a result, IR1 in file 12 has only an average efficient volume reported when in reality the maximum volume that is calculated and reported for file 10 is applicable to that acreage as well. In this case since the use is "shared" the data exists and is pertinent to the understanding of both water rights. The information should be reported.

21. The analysis of the use of water in the SDID to determine how much is in "excess" (Volume 1, p. 332, line 2) suffers from a lack of information. The period of record, although it may be the only available data, is 1967-1972. This is a very short period of record and is certainly not sufficient to establish a credible history which reflects fluctuations in runoff available for diversion. This time frame does not match DWR's base period for either the designation of active acres or crop histories. Since the latter two are critical to the bottom line calculated by DWR the results are certainly of questionable value.

22. The statement on p. 121, ¶3, of Volume 1 that the entire flow of the river was diverted by SDID is not complete. This must be defined in relation to median, average or some other flow scenario. During periods of high flows the dam may not be capable of diverting any water.

23. DWR has stated that acreages for irrigation PWRs are measured from aerial photos. Consideration must be given to modification of acreages through error analysis due to inaccuracies inherent in this method. The photos used are not rectified and the scale is only approximate at any given point on the photo. **DWR should publish a margin of error by percentage on each WFR map which contains irrigation PWRs.**

24. Why is a well which is supplying a primary storage reservoir (PS) or small reservoir (SR) water right which is used for irrigation not quantified in Wells Subject to Federal Claims, Volume 7? For example, a quantity is reported in Volume 7 for an SR as "up to 15 acft". This quantification is not consistent with the assignment of a specific volume to a well which serves an irrigation use directly.

25. Are stockponds which are less than 2 acres in size always given a conditional entitlement, or is a specific volume always assigned when the pond is surveyed, as is done in WFR 112-17-082? In that report claims for stock and wildlife are listed as "none" and "incidental" respectively. Where in the criteria is this situation explained? WFR 112-17-BAD-016 contains the same problem with the assignment of a volume except that the reservoir is an SR instead of an SP.

26. Although the retention factors for stockponds may be reasonable for the Walnut Gulch Study Area, ponds in other areas may have significantly higher retention factors.

27. How was a 50% value derived for stockpond seepage?

HISTORICAL ANALYSIS

1. DWR describes its investigation procedures for water supply organizations (includes municipalities) at pages 529-530. DWR limits its investigation to inspections, claims, and Corporation Commission files. Historical investigation is not one of the methods listed to determine dates of first use.

2. The introductory section on the history of the San Pedro watershed appears at pages 45-48. This material is cursory in nature, leaving out large periods and themes important in the historical development of the area. For example, there is no discussion of the Mexican Era (1810-1846). The historical section is primarily devoted to a description of mining and urban growth in the San Pedro Valley. Given the importance of agriculture to water use, some discussion of its development should be included in this introductory section. Because the purpose of the adjudication is to determine the validity of existing and prior water rights, an expanded analysis of past events would seem warranted since this material serves as a foundation for its analysis. The background history section would benefit from a discussion of the types of sources used to prepare the narrative, describing what materials are available on the history of the San Pedro watershed and where the records are located. **The text should indicate the source of the material used as the basis of information through a citation system.**

3. DWR lists a 1969 Corporation Commission charter at p. 282 as evidence for a municipal supply date of the system serving the community of St. David. This community was first settled in 1877.

4. The description of the Arizona Water Company Bisbee system pp. 257-256 states that it was purchased from APS in 1955. What is the relationship of this system to that of the historic mining town of Bisbee which was settled at an early date? The HSR states that it is "unknown" when APS acquired the system. It also states it is "unknown" how many service connections exist in the San Pedro watershed.

5. The historical description of the Benson municipal supply states at p. 260 that the "record of first water use is the Benson Water Company's articles of incorporation" which date to 1905. DWR notes that "presumably" water use occurred between the

founding of the town in 1880 and 1905. What evidence exists to support this claim?

GROUNDWATER SURFACE WATER INTERCONNECTION

1. DWR uses aquifer parameters applicable to the "younger alluvium" (floodplain aquifer) to calculate the extent of the bright lines. For those areas in which the bright line extends into the regional aquifer the methodology for calculating that extension is invalidated. The aquifer characteristics for the regional aquifer are very different from the floodplain aquifer, often by at least one order of magnitude. Has DWR analyzed the bright lines using aquifer parameters for the regional aquifer for those areas where the bright line appears to extend beyond the boundary of the floodplain aquifer?

2. **DWR should plot the actual data points on the watershed file report maps for which "a values" were calculated to establish the bright lines.** Since there are not many of these points their inclusion will not be a burden on DWR. It will allow the parties to determine the relationship between a particular well and the data point. This information may be used by the Special Master and the parties to decide upon the need for further analysis or to object to the status of specific wells found in the HSR.

3. Domestic uses without diversions should not be listed as having a subflow source of water. The criteria set up by DWR to implement the groundwater-surface water Order is based on an analysis of the well location, not the use location. **DWR should physically locate the diversion or well which supplies all domestic uses.** (It may be sufficient to locate wells only for domestic uses within the bright lines if a statistical analysis in the San Pedro reveals that subflow uses will not be missed when this criteria is implemented.)

4. In Appendix B of Volume 1 a description of natural losses is given which states that only groundwater inside the floodplain is subject to loss through evaporation or transpiration. This is not consistent with the application of the bright lines in areas where the lines extend outside the floodplain alluvium. It is also inconsistent with DWR's definition of significant diminishment in which all wells pumping from the regional aquifer may be affecting a federal reservation. Certainly natural depletions which are effectively created by the same mechanisms as pumping wells should be evaluated in the same way as those wells.

5. On p.180, ¶1 of Volume 1 if a stand of phreatophytes can act like small pumping wells, as is stated here, why has DWR

ignored the impact of actual wells and gone to great lengths to quantify phreatophyte usage?

6. On p.182, ¶3 Volume 1, if domestic wells are the first to be impacted by reduction in groundwater levels, as stated in lines 2-4, why has DWR chosen to downplay their significance by not including all of these wells in the HSR as to their location, quantification, date of first use, etc.

7. There is no explanation of how or if Zone 1 (subflow) wells are analyzed for impacts to federal reserved rights.

8. The Aravaipa special report for surface water users should contain a brief explanation as to why Upper Aravaipa Creek is excluded from inclusion within the area bounded by the bright lines.

9. On p.179, of Volume 1, the termination of natural uses would not result in an "equivalent" amount of discharge at the watershed outlet. Losses due to deep percolation would be expected.

10. On p. 68, ¶2 in Volume 1, the HSR states that groundwater is found in the floodplain aquifer in both confined and water table conditions. The floodplain aquifer must be at water table conditions for the subsequent descriptions of stream-aquifer relationships to be true.

11. On p.110, ¶5, in Volume 1 when irrigated acreage is supplied by a source which is in a different zone, problems arise with relation to return flows. DWR is assuming that the return flow goes back into the surface water system, but in reality it is dependent upon the location of the return flow in relation to the zones. Acreages found in Zone 2 which are supplied by surface water result in return flows to the regional aquifer, which is not considered to be part of the river system and source.

12. On p.180 in Volume 1, if springs are discharging to the river from canyon walls then the water added to the stream is clearly surface water and should be counted as runoff. This is not a gaining stream because of that addition.

FEDERAL RESERVED RIGHTS

1. The standards chosen to evaluate significant diminishment of federal claims should be described in more detail. The criteria for choosing eight wells in the Sierra Vista area is questionable because there are many more wells in that area which contribute to the cone of depression. The projection of economic impacts that <u>may</u> occur as a result of a theoretical

pumping regime and projected population statistics goes far beyond the standard of "significant diminishment."

2. The description for the criteria used to evaluate non-Indian federal reserved rights states that future potential uses are evaluated and reported by DWR. **An explanation should be given as to how these future potential uses are determined and the standards used to evaluate them.**

3. For common surface water suppliers such as SDID, acres which can not physically receive pumped well water should be identified separately in the special report.

4. DWR denotes its description of Fort Huachuca on pages 336-401 of Volume 1. Pages 370-372 include a general background history and pages 385-387 give a historical analysis of water use. DWR mentions that Fort Huachuca got its start as a temporary camp in 1877 and was designated permanent in 1878. DWR notes the two Executive Orders in 1881 and 1883 which established the military reservation and then expanded it. The two Executive Orders transferring some lands to the Coronado National Forest in 1925 and subsequently revoking the transfer in 1929 are not mentioned. DWR notes that the post was expanded in the 1940's but does not mention if this was by Executive Order. The 1957 Executive Order expansion is listed. The transfer of state land to the Fort is mentioned but no dates are given for these transfers.

5. On pages 360-361 of Volume 1 DWR discusses BLM claims to reserved rights. DWR does not present an analysis of the reserved right claims to the San Pedro Riparian National Conservation Area, stating that "these claims will be addressed in the final HSR." **DWR should include such analyses in all future preliminary HSRs to allow for meaningful comments.**

6. DWR includes a description of the dates important in the establishment of the Coronado National Memorial on page 402. One act was omitted: the July 9, 1952 redesignation of the international memorial prior to the establishment of the reservation by Presidential proclamation in November of 1952. A map showing the additions to the Memorial by date is included as Figure 5-29. **Maps showing dates of aquisitions and deletions should be included for all Federal reservations.**

7. The description by DWR of the establishment of the Rincon Unit of the Saguaro National Monument (Saguaro Monument East) mentions legislation which reduced the size of the reservation. No date or citation is mentioned or the legislation.

8. On p.43, what is the source for the boundaries of the San Carlos Reservation shown on the map? Are there other sources which show different boundaries?

WATER BUDGET/SUPPLY

1. The discussion of transmission losses should not be used to predict interferences by upstream users on downstream users. Although the identification of interferences is contemplated in the order on the 5th Set of Issues, the discussion of transmission losses in the HSR should not be used as a substitute for a case by case analysis. Some analysis of relative priority must be included in the discussion to accomplish the goal of the order.

2. The municipal depletion calculated in the water budget assumes return flow due to recharge from sewage disposal systems. There is no requirement that this water be returned to the "river system" and water quality standards may work to prohibit recharge in the future. **The HSR should note that supplies of effluent may be eliminated as a source of recharge in the future.**

3. A discussion of natural uses on p. 103 lists evaporation of stream flow and the use of water by riparian habitat as a natural use. However, a later discussion of instream flow rights lists these items as part of the right that has been certificated by DWR for 2 cases on the San Pedro. This raises the question of exactly how DWR is handling these uses in water budgets, in the description of transmission losses and in the watershed file reports.

4. **DWR should use an analysis of historical aerial photography to test whether phreatophyte conditions in the past match exactly with the conditions today.**

5. Was the classification method used by DWR to determine usage by phreatophytes compared to the other San Pedro phreatophyte studies, such as those performed for the SPRNCA and those by the Office of Arid Land Studies? It is appropriate to use DWR's methodology to duplicate those study areas in order to test the accuracy of DWR's methods. In light of the difficulties associated with using satellite imagery to identify phreatophyte communities this may be a reasonable verification technique.

6. In the discussions given for groundwater in storage on pages A-1 and A-2 of Volume 1, the number reported does not match the value resulting from a computation using the given parameters. For example, in the Upper San Pedro floodplain aquifer the specific yield is 0.12, the saturated thickness is 60 feet and the area is 39,338 acres. This computes to a total of

283,233 acft, while a figure of 282,290 acft is reported. Is a value other than the average saturated thickness used across the stated floodplain area?

7. Appendix A-1 in Volume 1 discusses the calculation of groundwater in storage in each sub-watershed of the San Pedro River watershed. The boundary of the floodplain used in this calculation does not appear to be the same as the boundary used to establish the bright lines or the phreatophyte/riparian salvage data.

8. On p.64, DWR describes groundwater as a renewable resource. However, only a small portion of the total groundwater in storage is normally recharged. Groundwater pumpage which results in compaction of the aquifer also results in a permanent loss of storage capability. This means that for those cases groundwater is not renewable.

9. On p.57, when DWR refers to infiltration rates in the valley what standard was used to determine that they were "insignificant?"

10. In Appendix A in Volume 1, why was 60 feet chosen as the average saturated thickness of the floodplain alluvium?

11. How did DWR determine the floodplain underflow from Mexico to Winkelman?

12. The chart on p. 133 of Volume 1 does not support the contention on p. 137 that the majority of the acreage is supplied by pumped groundwater. The chart in fact shows that only 36% of the acreage is supplied by wells pumping groundwater.

13. What percentage of the total stockpond depletions in the San Pedro watershed occur in Zone 3? Groundwater recharge in Zone 3 is a loss to the river system and source because Zone 3 is defined as having no connection to the regional aquifer, floodplain aquifer or stream.

14. On p.7, DWR discussed the "over-appropriation of surface water in the Gila River system." Whether or not the river system is fully appropriated depends upon the flow in the river. During periods of high flow all water has not been appropriated. The over-appropriation of a stream is a legal determination not a technical one.

2834M

SAN PEDRO WATERSHED DIF :T SURFACE WATER DIVERSIONS

	Serves		Parcel Served		
Ditch Name	Owner	WFR#	Date	Acres	Total Acreage Served
East Ditch	Anderson	115-10-BA-001	1972	199.0	
West Ditch	Anderson	115-10-BA-001	1972	Same	199.0
Salazar - Tapia Ditch	Fraser	115-05-AB-4	1867	6.2	
a.k.a. East Diversion #4	Miranda	115-05-AB-3	1867	4.7	
	Pacheco	115-05-AB-2	1867	1.7	
	Salazar	115-05-AB-1	1867	4.1	
	Nature Conservancy	115-05-AC-5	1880	1.6	18.3
Nature Conservancy/	Claridge	115-05-AC-004	1867	26.0	
Claridge Ditch	Nature Conservancy	115-05-AC-005	1867	15.6	41.6
Nature Conservancy	BLM	115-05-AC-10	1908	2.0	
West Ditch	Nature Conservancy	115-05-AC-005	1880	24.4	26.4
Unnamed	Nature Conservancy	115-05-AC-005	1936	16.9	16.9
Westerfield Diversion	Nature Conservancy	115-05-AAD-2	1888	15.0	15.0
Unnamed	Geldmacher	115-04-ADC-001	1887	9.7	9.7
Unnamed	Rubin	115-04-ADC-006	1936	1.7	1.7
Bayless Ditch	Bayless & Berkalew	113-12-BD-004	1900	89.4	
			1979	32.8	
			1984	27.2	149.4
Markham Ditch	Bayless & Berkalew	113-12-BD-004	1955	19.7	
	Kelly	113-12-BB-006	1906	38.8	
			1971	3.2	62.2
Unnamed	Fry	111-23-BDCA-009	1907	4.3	4.3
Pomerene Canal	District	32 Parcels	1912	639.8	
		22 Parcels	Post-1912	410.6	1050.4
St. David Ditch	District	67 Parcels	1881	575.6	
		34 Parcels	1916	286.6	
		31 Parcels	Post-1916	190.3	1053.4

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